

**State of California
AIR RESOURCES BOARD**

**Executive Order VR-401-B
OPW Phase I Enhanced Vapor Recovery (EVR) System
For
Aboveground Storage Tanks (AST)**

WHEREAS, the California Air Resources Board (ARB) has established, pursuant to California Health and Safety Code sections 39600, 39601 and 41954, certification procedures for systems designed for the control of gasoline vapor emissions during the filling of aboveground gasoline storage tanks, in its **CP-206, *Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities Using Aboveground Storage Tanks*** (Certification Procedure) as adopted on May 2, 2008 incorporated by reference in title 17, California Code of Regulations, section 94016;

WHEREAS, ARB has established, pursuant to California Health and Safety Code sections 39600, 39601 and 41954, test procedures for determining the compliance of Phase I vapor recovery systems with emission standards;

WHEREAS, OPW requested and was granted certification of the OPW Phase I EVR System for Single-Wall AST pursuant to the Certification Procedure on February 3, 2010, by Executive Order VR-401-A;

WHEREAS, OPW requested modification of the OPW Phase I System (OPW System) to include protected tanks and additional components;

WHEREAS, the Certification Procedure provides that ARB Executive Officer shall issue an Executive Order if he or she determines that the vapor recovery system conforms to all of the applicable requirements set forth in the Certification Procedure;

WHEREAS, I, James N. Goldstene, ARB Executive Officer, find that the OPW System conforms with all the requirements set forth in the Certification Procedure and results in a vapor recovery system which is at least 98.0 percent efficient as tested pursuant to the test procedure **TP-201.1, *Volumetric Efficiency for Phase I Systems (October 8, 2003)***;

NOW THEREFORE, IT IS HEREBY ORDERED that the OPW System is certified to be at least 98.0 percent efficient when used with ARB Standing Loss Control Executive Orders VR-301 and VR-302 series. Exhibit 1 contains a list of the certified components, Exhibit 2 contains the performance standards and specifications, typical installation drawings, and maintenance intervals applicable to the OPW System as installed in a gasoline dispensing facility (GDF) with an AST. Exhibit 3 contains the manufacturing specifications. Exhibit 4 contains a test procedure for determination of static pressure performance of vapor recovery systems at gasoline dispensing facilities with AST.

IT IS FURTHER ORDERED that compliance with the applicable certification requirements, rules and regulations of the Division of Measurement Standards of the Department of Food and Agriculture, the Office of the State Fire Marshal of the Department of Forestry and Fire Protection, and the Division of Occupational Safety and Health of the Department of Industrial Relations are made conditions of this certification.

IT IS FURTHER ORDERED that OPW shall provide a warranty for the vapor recovery system and components to the initial purchaser. The warranty shall be passed on to each subsequent purchaser within the warranty period. The manufacturer of components listed in Exhibit 1 not manufactured by OPW shall provide a warranty to each of their components certified herein. The warranty shall include the ongoing compliance with all applicable performance standards and specifications, and shall comply with all warranty requirements in Section 17.5 of the Certification Procedure. OPW or other manufacturers may specify that the warranty is contingent upon the use of trained installers.

IT IS FURTHER ORDERED that each certified component manufactured by OPW shall be performance tested by the manufacturer as provided in Exhibit 3.

IT IS FURTHER ORDERED that the certified OPW System shall be installed, operated and maintained in accordance with the **ARB-Approved Installation, Operation and Maintenance Manual for Executive Order VR-401-B OPW Phase I Enhanced Vapor Recovery System for Aboveground Storage Tanks**. A copy of this Executive Order and manual shall be maintained at each GDF where a certified OPW System is installed.

IT IS FURTHER ORDERED that all equipment listed in Exhibit 1, unless exempted, shall be clearly identified with a permanent identification showing the manufacturer's name and model number.

IT IS FURTHER ORDERED that any alteration in the equipment parts, design, installation or operation of the system certified hereby is prohibited and deemed inconsistent with this certification unless the alteration has been submitted in writing and approved in writing by the Executive Officer or Executive Officer's delegate.

IT IS FURTHER ORDERED that the following requirements be made a condition of certification. The owner or operator of the OPW system shall conduct, and pass, the following tests no later than 60 days after startup and at least once every three years after startup testing, using the following test procedures: Exhibit 4, **Determination of Static Pressure Performance of Vapor Recovery Systems at Gasoline Dispensing Facilities with Aboveground Storage Tanks, TP-201.1B, Static Torque of Rotatable Phase I Adaptors (October 8, 2003), if rotatable vapor adaptors are installed**. Shorter time periods may be specified in accordance with local district requirements. Notification of testing, and submittal of test results, shall be done in accordance with local district requirements and pursuant to the policies established by that district. Alternate test procedures, including most recent versions of test

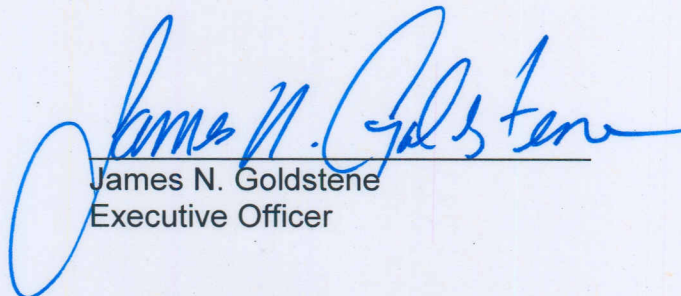
above, may be used if determined by the ARB Executive Officer or Executive Officer delegate, in writing, to yield equivalent results.

IT IS FURTHER ORDERED that the OPW System shall be compatible with gasoline in common use in California at the time of certification. The OPW system is not compatible with gasoline that has methanol content greater than 5 percent, ethanol content greater than 10 percent, or methyl tert butyl ether (MTBE) content greater than 15 percent. Any modifications to comply with future California gasoline requirements shall be approved in writing by the Executive Officer or Executive Officer delegate.

IT IS FURTHER ORDERED that Executive Order VR-401-A issued on February 3, 2010 is hereby superseded by this Executive Order. OPW System certified under Executive Order VR-401-A may remain in use at existing installations. This Executive Order shall apply to new installations or major modification of the Phase I system of existing gasoline dispensing facility.

IT IS FURTHER ORDERED that the certification of the OPW System is valid through March 1, 2014.

Executed at Sacramento, California, this 12 day of July, 2010.



James N. Goldstene
Executive Officer

Attachments:

- | | |
|-----------|---|
| Exhibit 1 | Equipment List |
| Exhibit 2 | Installation, Maintenance and Compliance Standards and Specifications |
| Exhibit 3 | Manufacturing Performance Standards and Specifications |
| Exhibit 4 | Determination of Static Pressure Performance of Vapor Recovery Systems at Gasoline Dispensing Facilities with Aboveground Storage Tanks |

Exhibit 1 Equipment List

<u>Equipment</u>	<u>Manufacturer/Model Number</u>
Emergency Vent (Figure 1A)	<p>OPW 301W-XYZ</p> <p><i>W represented by:</i></p> <p style="padding-left: 40px;"><i>blank = female threads</i></p> <p style="padding-left: 40px;"><i>M = male threads</i></p> <p style="padding-left: 40px;"><i>F = #150 flange mounted</i></p> <p><i>X represented by:</i></p> <p style="padding-left: 40px;"><i>2 = 2.0" vent</i></p> <p style="padding-left: 40px;"><i>3 = 3.0" vent</i></p> <p style="padding-left: 40px;"><i>4 = 4.0" vent</i></p> <p style="padding-left: 40px;"><i>5 = 5.0" vent</i></p> <p style="padding-left: 40px;"><i>6 = 6.0" vent</i></p> <p style="padding-left: 40px;"><i>8 = 8.0" vent</i></p> <p style="padding-left: 40px;"><i>1 = 10.0" vent</i></p> <p><i>YY represented by:</i></p> <p style="padding-left: 40px;"><i>08 = 8oz/sq.in.</i></p> <p style="padding-left: 40px;"><i>16 = 16oz/sq.in.</i></p> <p><i>Z represented by:</i></p> <p style="padding-left: 40px;"><i>0 = female NPT threads</i></p> <p style="padding-left: 40px;"><i>1 = male NPT threads</i></p> <p style="padding-left: 40px;"><i>5 = #150 flange</i></p>
<p>Note: For flange mounted models use gasket material made by Fibreflex. More information is available at http://www.fibreflex.com.</p>	
Direct Fill Spill Container Assembly With Drain Valve (Figures 1B and 1C)	<p>OPW 33X-ASTWYZ (spill container)</p> <p><i>X represented by:</i></p> <p style="padding-left: 40px;"><i>1 = welded bucket</i></p> <p style="padding-left: 40px;"><i>2 = seamless bucket</i></p> <p><i>Y represented by:</i></p> <p style="padding-left: 40px;"><i>3 = 3.5 gallon capacity</i></p> <p style="padding-left: 40px;"><i>5 = 5.0 gallon capacity</i></p> <p style="padding-left: 40px;"><i>7 = 7.0 gallon capacity</i></p> <p><i>Z represented by:</i></p> <p style="padding-left: 40px;"><i>4 = 4.0" NPT base</i></p> <p style="padding-left: 40px;"><i>6 = 6.0" NPT base</i></p> <p>OPW 1DK-2100EVR (drain valve)</p>

Equipment

Manufacturer/Model Number

Overfill Prevention Device with Drop Tube (Figure 1D and 1E)

OPW 61FSTOP-XXXXT (overfill device)

XXXX represented by:

1000 = 2.0" vertical float

2000 = 2.0" swing style float

3050 = 3.0" vertical style float

OPW 61FT-DDLL (drop tube)

DD represented by:

02 = 2.0" drop tube

03 = 3.0" drop tube

LL= length in feet

OPW 53-00XX (double tapped bushing for remote fill configurations)

XX represented by:

36 = 4.0"x2.0"x2.0"

38 = 4.0"x3.0"x3.0"

62 = 6.0"x2.0"x2.0"

63 = 6.0"x3.0"x3.0"

Non-Rotatable Product Adaptor (Kamvalok Adaptor) (Figure 1F)

OPW 161BAN-YYYY

B represented by:

1 = Buna seal

2 = Viton seal

YYYY represented by:

0150 = 1.5" NPT

0200 = 2.0" NPT

0300 = 3.0" NPT

*2040 = dual 2.0"x4.0" NPT**

*3060 = dual 3.0"x6.0" NPT**

**Note: Dual fittings are needed when using a direct fill spill container*

Equipment

Manufacturer/Model Number

**Product Adaptor Dust Caps
(Figures 1G and 1H)**

OPW 634B-0XXX

XXX represented by:

150 = 2.0"

160 = 2.5"

180 = 4.0"

OPW 634BK-0XXX (optional locking cap)

XXX represented by:

090 = 2.0"

100 = 3.0"

200 = 4.0"

Examples of Kamvalok adaptors and dust cap combinations:

1612AN-0150 requires 634B-0150 or 634BK-090

1612AN-0200 requires 634B-0160

1612AN-0300 requires 634B-0180 or 634BK-0200

1612AN-2040 requires 634B-0160

1612AN-3060 requires 634B-0180 or 634BK-0200

**Product Coupler "Kamvalok Coupler"
(Figure 1I)**

OPW 1711DL-YYYY or 1712DL-YYYY
(viton seal)

*L = locking coupler and blank for non-
locking coupler*

YYYY represented by:

1085 = 1.5"

1090 = 2.0"

1095 = 3.0"

Note: During fuel deliveries, an OPW Kamvalok coupler (part numbers 1711D, 1711DL, 1712D, and 1712DL) shall be used with an OPW Kamvalok product adaptor (part numbers OPW 1612AN). The Kamvalok coupler can be provided by the fuel supplier or provided by the GDF operator.

<u>Equipment</u>	<u>Manufacturer/Model Number</u>
Non-Rotatable Vapor Adaptor (Figure 1J)	OPW 1611AV-16YY YY represented by: 05 = 3.0" NPT 20 = 4.0" NPT OPW 1611AVB-EVR Bronze 4" NPT
Rotatable Vapor Adaptor (Figure 1J)	OPW 61VSA-1020-EVR Bronze, 4" NPT, Rotatable
Vapor Adaptor Dust Cap (Figure 1K)	OPW 1711T-7085-EVR OPW 1711LPC-0300 Ductile iron low profile cap
Dedicated Gauging Port with Drop Tube Assembly (Figures 1G, 1H, 1L, 1M, and 1N)	OPW 204247 (port cage) OPW 634B-0XXX (dust cap) XXX represented by: 140 = 1.5" 150 = 2.0" OPW 634BK-0090 (optional 2" locking cap) OPW 633AST-0XXX (female NPT Kamlok adaptor) XXX represented by: 150 = 1.5" 200 = 2.0" OPW 53-00XX (double tapped bushing) XX represented by: 12 = 2.0"x1.5"x1.5" 02 = 3.0"x2.0"x2.0" 34 = 4.0"x1.5"x1.5" 36 = 4.0"x2.0"x2.0" 62 = 6.0"x2.0"x2.0"

Equipment

Manufacturer/Model Number

**Mechanical Tank Gauging (optional)
(Figures 1O, 1P, and 1R)**

OPW 200TG-XXXYY (tank gauge)

*XXX represented by:
ENG = English units
MET = SI units*

*YY represented by:
blank = 20' cable length
40 = 40' cable length*

OPW 61T-02LL (drop tube for use with
tank gauge)

LL =length in feet

OPW TGTA-0400* (optional combo fitting)

*Allows for installation of mechanical tank
gauge and overfill alarm on the same bung
location.

**Liquid Level Overfill Alarm (optional)
(Figure 1Q)**

OPW X44TA-0100

*X represented by:
1 = 1 channel
4 = 4 channel*

OPW 44TA-LLFS (liquid level float switch
assembly)

Table 1
Components Exempt from Identification Requirements

Component Name	Manufacturer	Model Number
Drain Valve	OPW	OPW 1DK-2100EVR
Tank Bung Combo Fitting	OPW	OPW TGTA-0400
Drop Tube for Overfill Prevention Device	OPW	OPW 61FT-<u>DDL</u>
Pipe Fittings	OPW	OPW 53-0<u>XX</u>
Kamlok Female NPT Adaptors	OPW	633FAST-0<u>XXX</u>
Remote Spill Containers	OPW	6211R



Figure 1A
OPW 301W-XYZ Series Emergency Vents



Figure 1A
OPW 301F-XYZ Series Flange Mounted Emergency Vents

Note: For flange mounted models use gasket material made by Fibreflex. More information is available at <http://www.fibreflex.com>.



Figure 1B
OPW 33X-ASTWYZ - Direct Fill Spill Container



Figure 1C
OPW 1DK-2100EVR - Direct Fill Spill Container Drain Valve



Figure 1D
OPW 61FSTOP-XXXXT Overfill Prevention Device

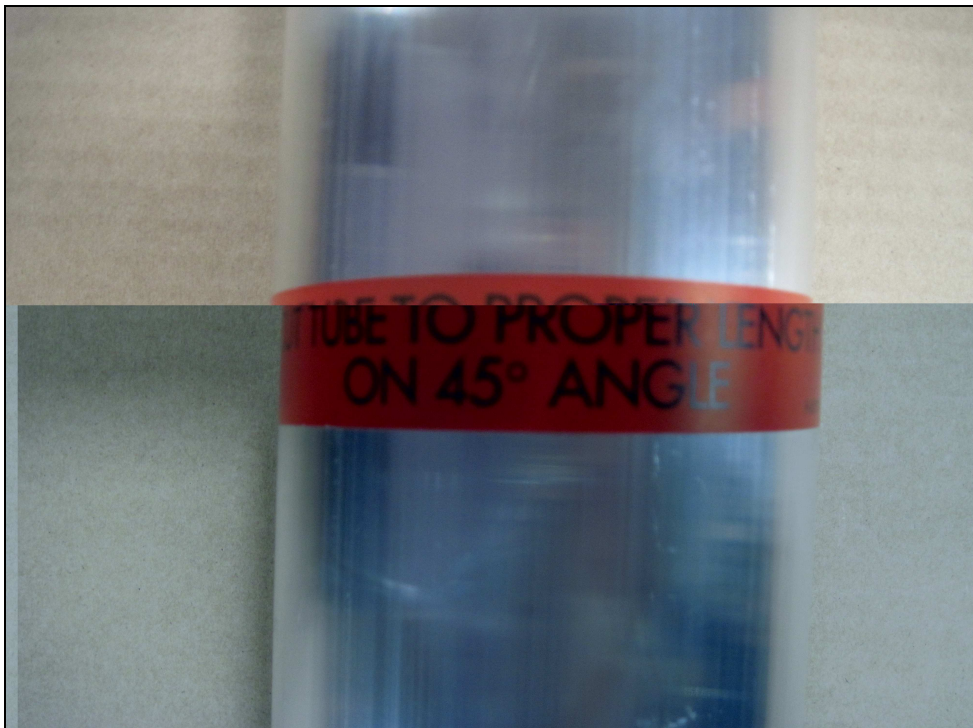


Figure 1E
OPW 61FT-DDLL Drop Tube
(For use with overfill prevention device only.)

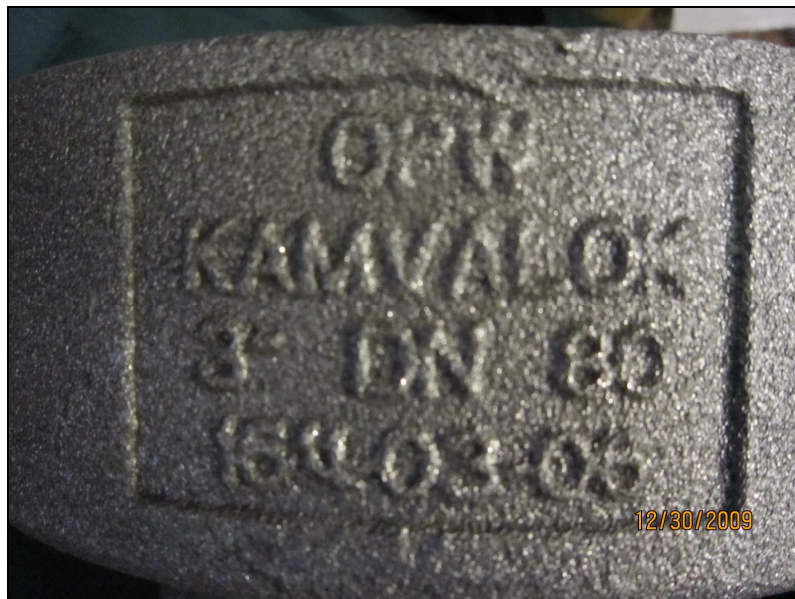


Figure 1F
OPW 1612AN-YYYY Non-Rotatable Product Adaptor (Kamvalok Adaptor)



Figure 1G
OPW 634B-0XXX Product Dust Cap
(Also used for dedicated gauging port.)



Figure 1H
OPW 634BK-0XXX Product Locking Dust Cap
(Also used for dedicated gauging port.)

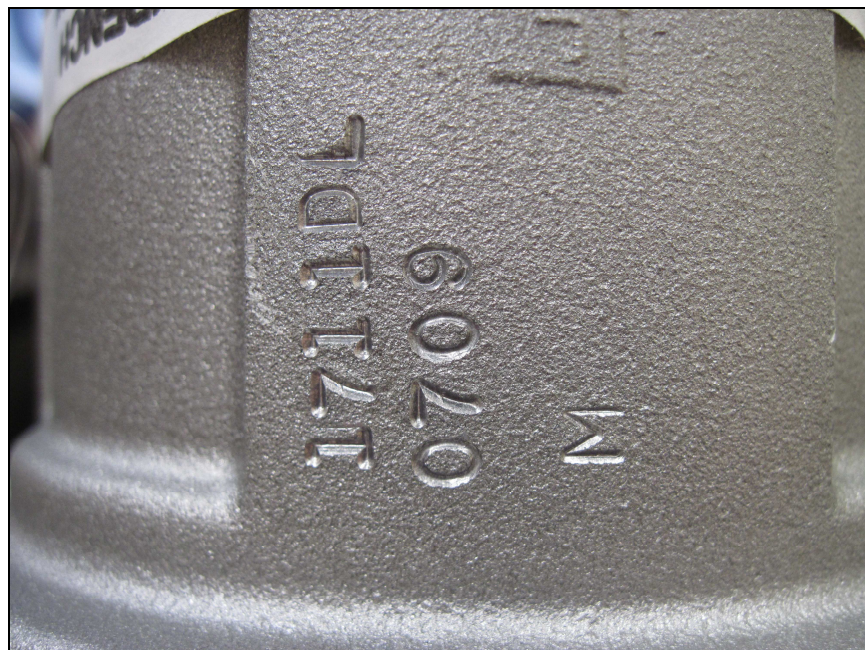


Figure 1I
OPW 1711DL -YYYY Kamvalok Product Coupler
(Required for fuel deliveries, see note under equipment list in this Exhibit.)



Figure 1J
OPW 1611AV-16YY Non-Rotatable Vapor Adaptor



Figure 1J
OPW 1611AVB-1625 Bronze Non-Rotatable Vapor Adaptor



Figure 1J
OPW 61VSA-1020-EVR Bronze Rotatable Vapor Adaptor

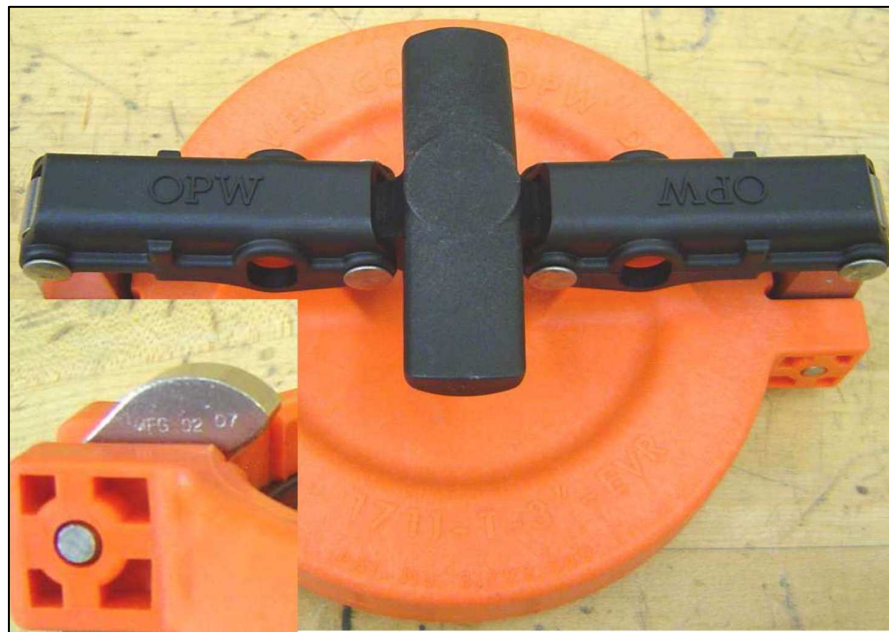


Figure 1K
OPW 1711T-7085-EVR Vapor Adaptor Dust Cap

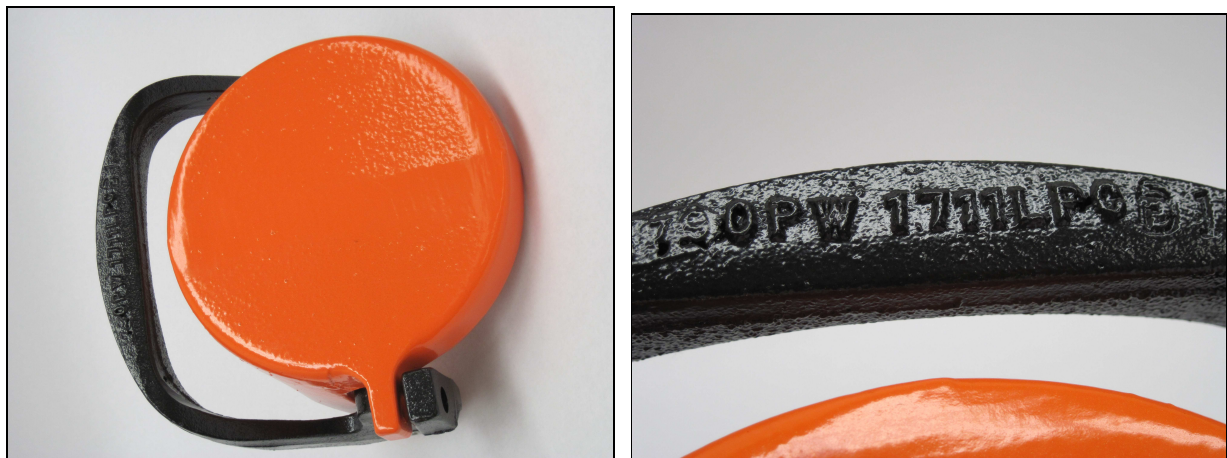


Figure 1K
OPW 1711LPC-0300 Ductile Iron Vapor Adaptor Dust Cap



Figure 1L
OPW 204247 Dedicated Gauging Port Cage



Figure 1M
633AST-0XXX Female NPT Kamlok Adaptor for Dedicated Gauging Port



Figure 1N
OPW 53-00XX Double Tapped Bushing
(Reducer for dedicated gauging port.)



Figure 10
OPW 200TG-XXXX Mechanical Tank Gauge (optional)



Figure 1P
OPW 61T-02LL Tank Gauge Drop Tube
(For mechanical tank gauge only.)



Figure 1Q
OPW X44TA-0100 Liquid Level Overfill Alarm (optional)



Figure 1R
OPW TGTA-0400
(Optional combo fitting for installation of tank gauge and overfill alarm.)

Exhibit 2

Installation, Maintenance, and Compliance Standards and Specifications

This exhibit contains the installation, maintenance and compliance standards and specifications applicable to the OPW Phase I Enhanced Vapor Recovery (EVR) system (OPW system) installed on aboveground storage tanks (AST).

General Specifications

1. Typical installations of the OPW System are shown in Figures 2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2L and 2M.
2. The OPW System shall be installed, operated, and maintained in accordance with ***ARB Approved Installation, Operation and Maintenance Manual for the OPW Phase I Enhanced Vapor Recovery System for Aboveground Storage Tanks***.
3. Any repair or replacement of system components shall be done in accordance with ***ARB Approved Installation, Operation and Maintenance Manual for the OPW Phase I Enhanced Vapor Recovery System for Aboveground Storage Tanks***.
4. Unless otherwise specified in this Executive Order (EO), the OPW system shall comply with the applicable performance standards and performance specifications in CP-206.
5. Maintenance and repair of system components, including removal and installation of such components in the course of any required tests, shall be performed by OPW Certified Technicians.

Vapor Recovery and Non-rotatable Product (Kamvalok) Adaptors

1. OPW rotatable and non-rotatable vapor and product adaptors (Kamvalok adaptors) are not specifically certified with an allowable leak rate and shall not leak. Compliance with this requirement shall be verified by the use of commercial liquid leak detection solution or by bagging, when the vapor containment space of AST is subjected to a non-zero pressure. (Note: Leak detection solution will detect leaks only when positive gauge pressure exists).
2. Rotatable vapor recovery adaptors shall be capable of at least 360-degree rotation and have an average static torque not to exceed 108 pound inch (9 pound-foot). Compliance with this requirement shall be demonstrated in accordance with ***TP-201.1B, Static Torque of Rotatable Phase I Adaptors (October 8, 2003)***.
3. The bung diameter and associated vapor return piping of AST shall be greater than or equal to the diameter of the Phase I product bung and associated product piping. In addition, no liquid condensate traps are allowed within the Phase I vapor return path piping under this configuration.

Product Coupler (Kamvalok Coupler)

Kamvalok product couplers shall fit the matching non-rotatable Kamvalok product adapters so that spillage of gasoline during fuel deliveries is minimized. During fuel deliveries, an OPW Kamvalok coupler (part numbers 1711D, 1711DL, 1712D, and 1712DL) shall be used with an OPW Kamvalok product adaptor (part numbers 1611AN and 1612AN). The Kamvalok coupler can be provided by the fuel supplier or provided by the gasoline dispensing facility (GDF) operator.

Vapor and Product Adaptor Dust Caps

Dust caps with intact gaskets shall be installed on all Phase I product and vapor adaptors.

Emergency Vents

The emergency vents are not specifically certified with an allowable leak rate and shall not leak. Compliance with this requirement shall be verified by the use of commercial liquid leak detection solution or by bagging, when the vapor containment space of AST is subjected to a non-zero pressure. (Note: Leak detection solution will detect leaks only when positive gauge pressure exists).

Direct Fill Spill Container Drain Valve

The direct fill spill container drain valve is configured to drain liquid directly into the ullage space of the AST. The drain valve is not specifically certified with an allowable leak rate and shall not leak. Compliance with this requirement shall be verified by the use of commercial liquid leak detection solution or by bagging, when the vapor containment space of AST is subjected to a non-zero pressure. (Note: Leak detection solution will detect leaks only when positive gauge pressure exists).

Dedicated Gauging Port with Drop Tube

AST shall be configured with a dedicated port for manual tank gauging (used to measure gasoline levels in AST with a gauging stick). The gauging port shall have a drop tube with an OPW cap and Kamlok adapter. The dedicated port and all associated components are not specifically certified with an allowable leak rate and shall not leak. Compliance with this requirement shall be verified by the use of commercial liquid leak detection solution or by bagging, when the vapor containment space of AST is subjected to a non-zero pressure. (Note: Leak detection solution will detect leaks only when positive gauge pressure exists).

Tank Gauge Components (Optional)

The tank gauge components are not specifically certified with an allowable leak rate and shall not leak. Compliance with this requirement shall be verified by the use of

commercial liquid leak detection solution or by bagging, when the vapor containment space of AST is subjected to a non-zero pressure. (Note: Leak detection solution will detect leaks only when positive gauge pressure exists).

Overfill Prevention Device

1. The overfill prevention device (overfill device) is designed to restrict the flow of gasoline delivered to AST when liquid levels exceed a specified capacity. The overfill device is an optional component of AST vapor recovery system. If a regulatory agency requires the installation of an overfill prevention device, then the device listed in Exhibit 1 shall be used.
2. The overfill prevention device is installed below the OPW product adaptor (see figure 2A and 2E) which has a built in poppet (Kamvalok) to prevent vapor leakage and spillage of product after delivery. The overfill prevention device is not specifically certified with an allowable leak rate and the leak rate cannot be determined by testing. Testing to determine the leak rate of the overfill prevention device is not needed since leaks from other components (e.g., Kamvalok product and vapor adaptors, emergency vents, spill container drain valves, dedicated gauging port, tank gauge components, connectors, and fittings) can be determined by procedures specified in this Exhibit.
3. The discharge opening of the fill pipe must be entirely submerged when the liquid level is above the bottom of the tank as shown in figures 2A, 2E, and 2K (see figures for installation details).

Remote Fill Configuration

Under remote fill configurations (also referred to as side fill), the Phase I vapor recovery piping shall be constructed of galvanized-steel or an equivalent material that has been listed for use with gasoline. If a material other than galvanized steel is used AST operator shall provide a manufacturers' listing demonstrating that the material is compatible for use with gasoline. The bung diameter and associated vapor return piping of AST shall be greater than or equal to the diameter of the Phase I product bung and associated product piping. In addition, no liquid condensate traps are allowed within the Phase I vapor return path piping under this configuration.

Connections and Fittings

All connections and fittings not specifically certified with an allowable leak rate shall not leak. Compliance with this requirement shall be verified by the use of commercial liquid leak detection solution or by bagging, when the vapor containment space of the AST is subjected to a non-zero pressure. (Note: Leak detection solution will detect leaks only when positive gauge pressure exists).

Maintenance Records

Each GDF operator/owner shall keep records of maintenance performed at the facility. Such record shall be maintained on site or in accordance with district requirements or policies. The records shall include at a minimum the maintenance or test date, repair date to correct test failure, maintenance or test performed, affiliation, telephone number, name and Certified Technician Identification Number of individual conducting maintenance or test. Additional information may be required in accordance with district requirements. An example of a Phase I Maintenance Record is shown in Figure 2N.

Table 2-1
AST Compliance Standards and Specifications

Component / System	Test Method	Standard or Specification
Rotatable Phase I Vapor Adapters	TP-201.1B	Minimum, 360-degree rotation Maximum, 108 pound-inch average static torque
Phase I Adaptors	Leak Detection Solution or Bagging	No Leaks
Emergency Vents	Leak Detection Solution or Bagging	No Leaks
Spill Container Drain Valve	Leak Detection Solution or Bagging	No Leaks
Dedicated gauging port with drop tube and tank gauge components	Leak Detection Solution or Bagging	No Leaks
Vapor Recovery System	Exhibit 4	As specified in Exhibit 4 of this Executive Order and/or CP-206
All connections and fittings certified without an allowable leak rate	Leak Detection Solution or Bagging	No Leaks

Table 2-2
Maintenance Intervals for System Components

Manufacturer	Component	Maintenance Interval
OPW	Tank Gauge Components	Annual
OPW	Dust Caps	Annual
OPW	Emergency Vents	Annual
OPW	Phase I Product and Vapor Adaptors	Annual
OPW	Spill Container Drain Valve	Annual

Figure 2A
Typical Direct Fill (Product Side) Installation of OPW Phase I EVR System for AST

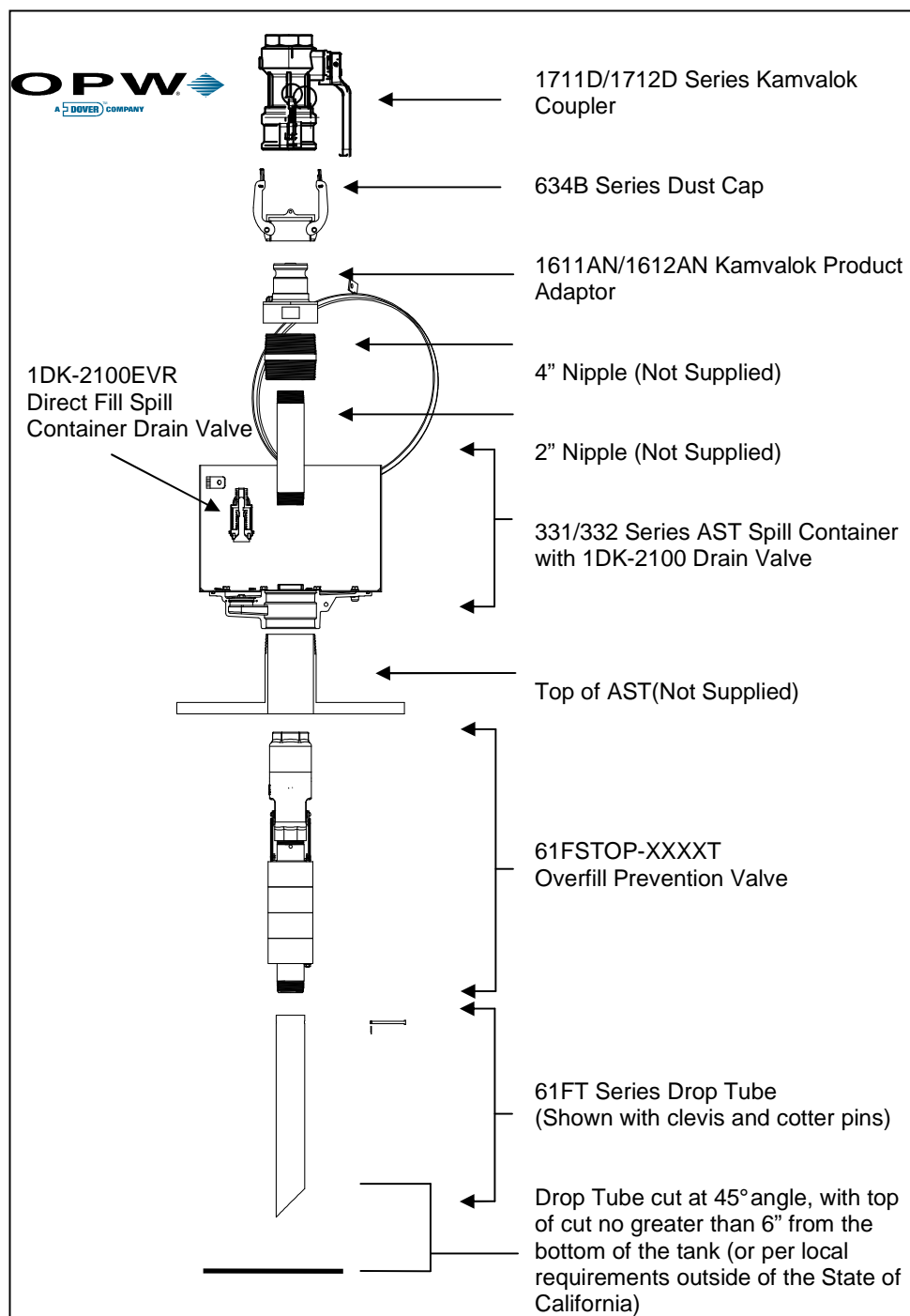


Figure 2B
Typical Vapor Recovery Adapter Configurations of OPW Phase I EVR System for AST

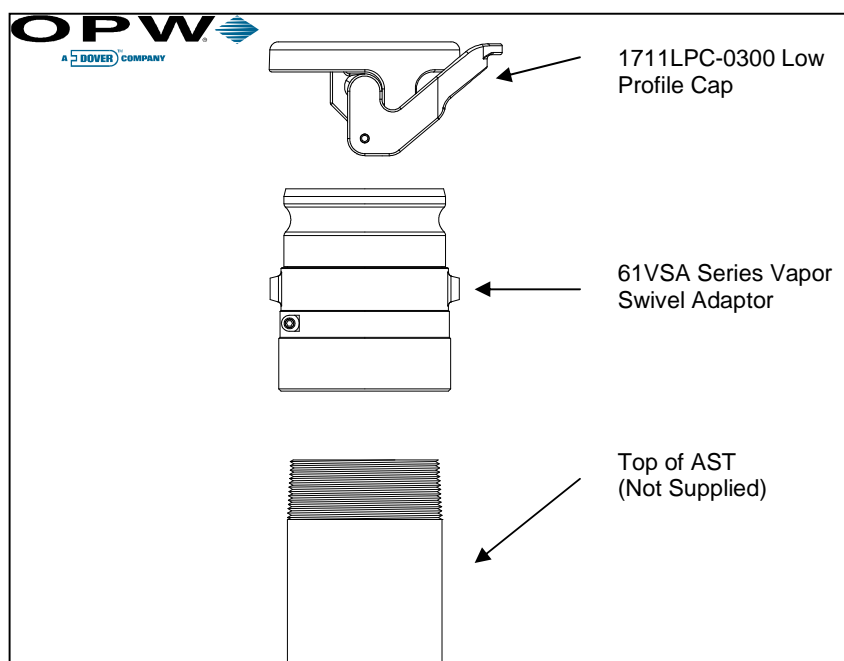
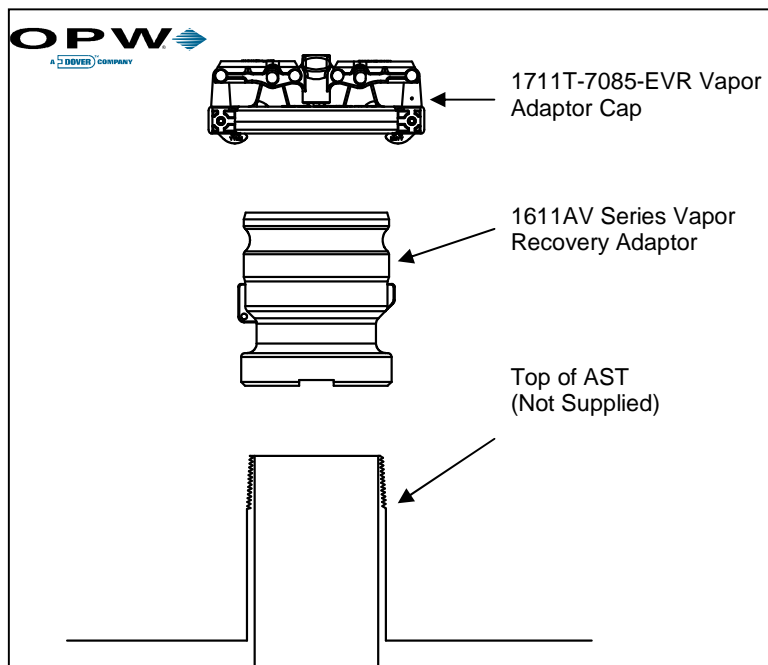
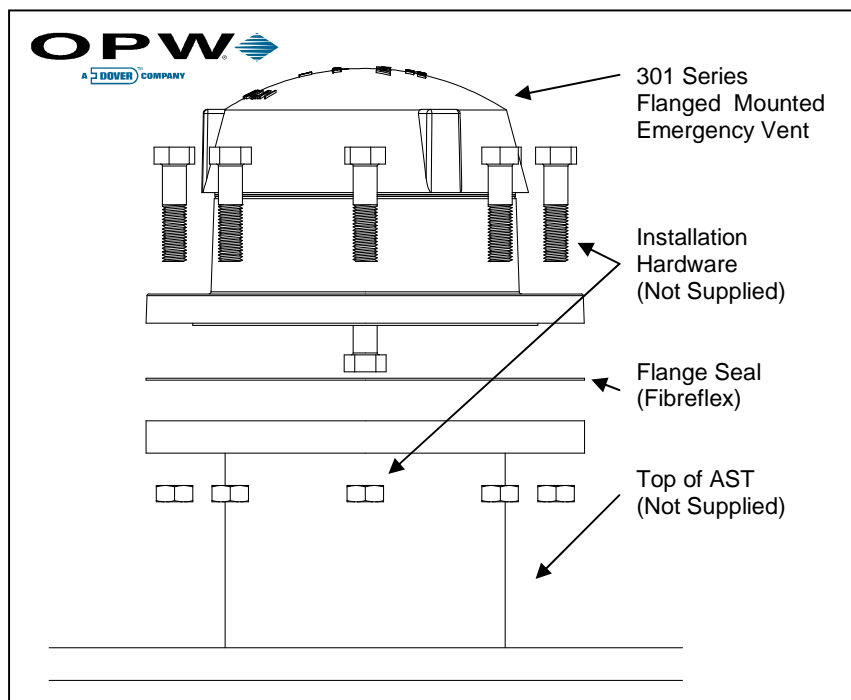
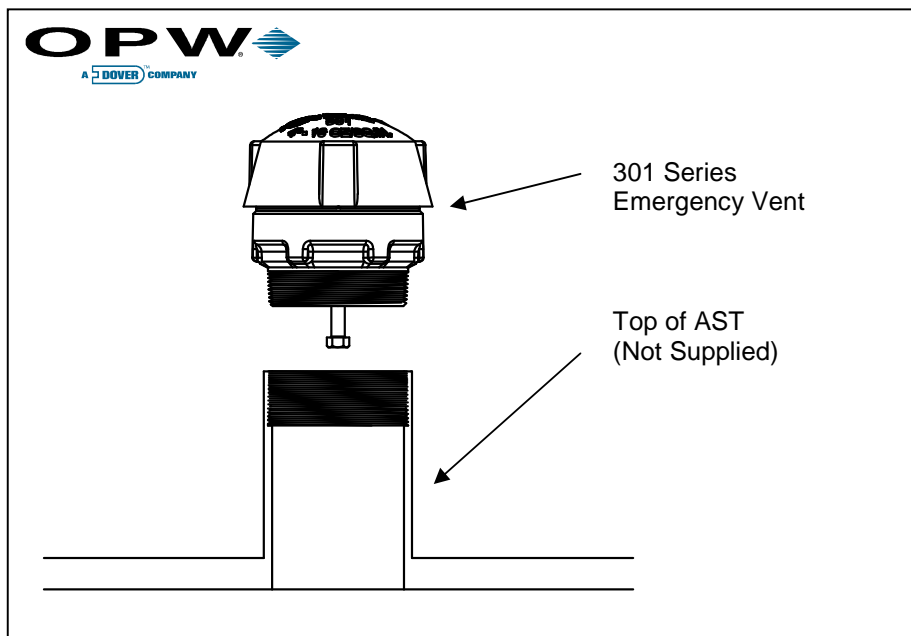


Figure 2C
Typical Emergency Vent Valve Configurations of OPW Phase I EVR System for AST



Note: For flange mounted models use gasket material made by Fibreflex. More information is available at <http://www.fibreflex.com>.

Figure 2D
Typical Remote Fill Configuration of OPW Phase I EVR System for AST
(Note: The remote spill container is not a vapor recovery component.)

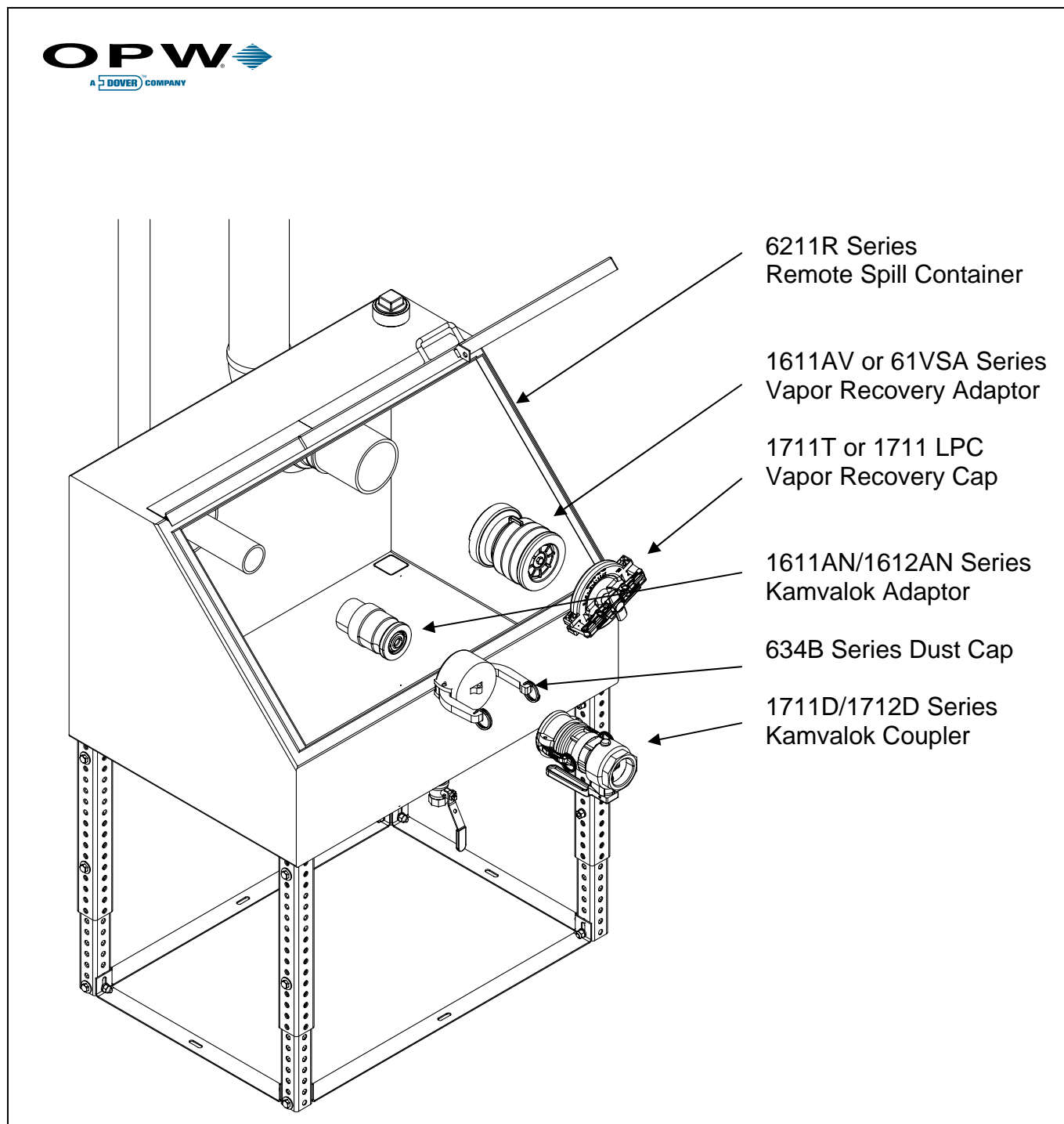


Figure 2E
Typical Remote Product Pathway Configuration for AST – Tank Side

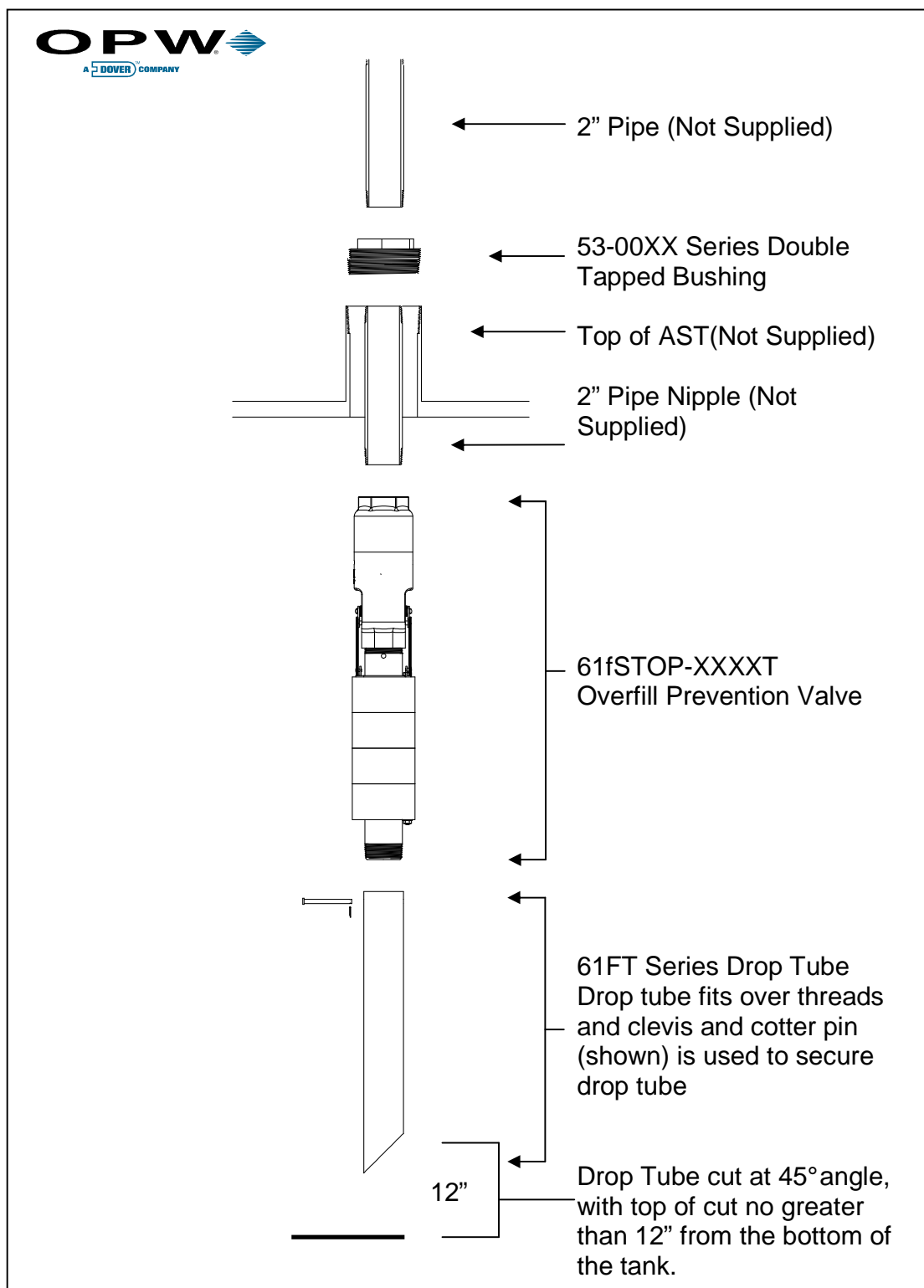


Figure 2F
Typical OPW Kamvalok Coupler and Adaptor

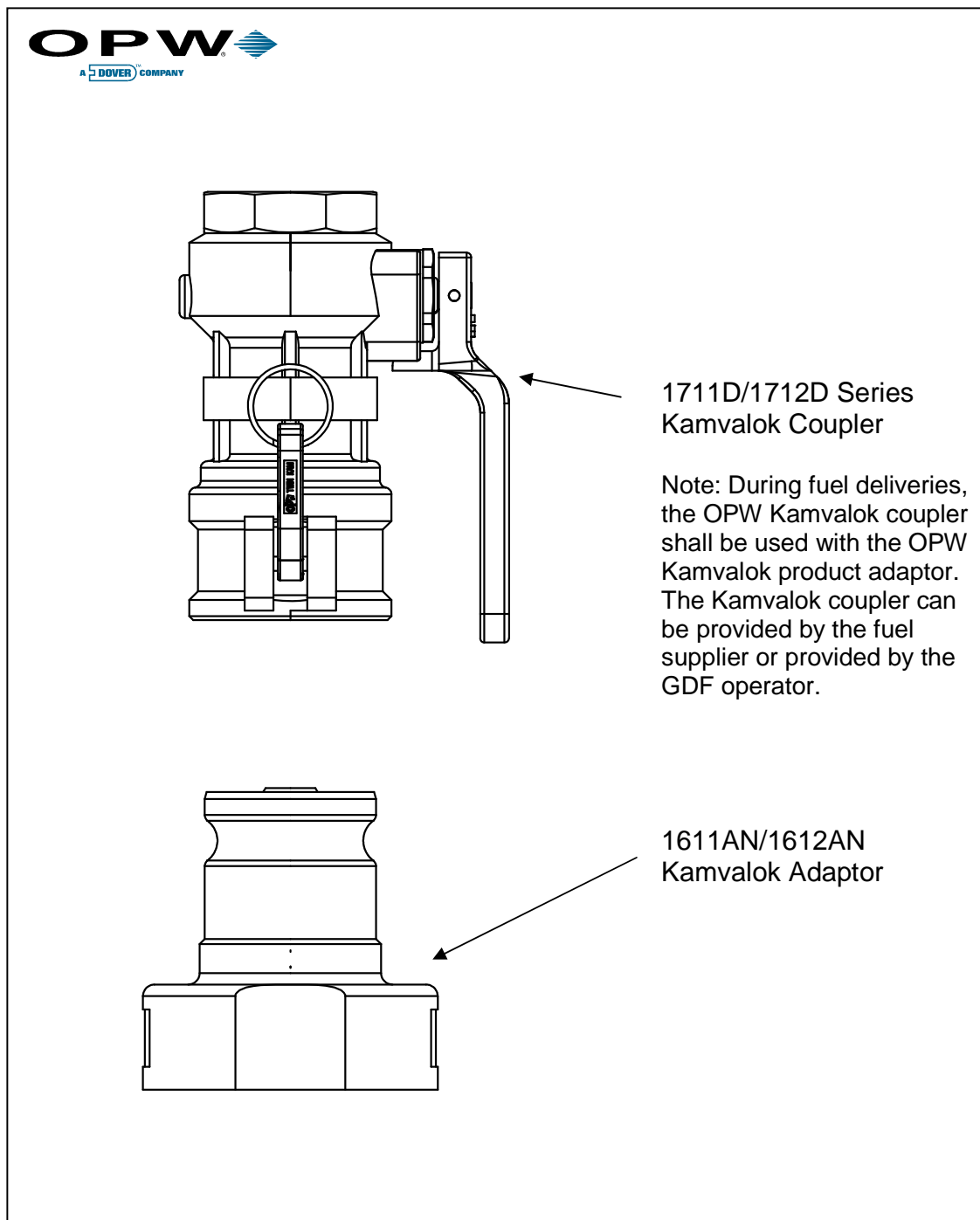


Figure 2G
Typical Mechanical Tank Gauge Configuration of OPW Phase I EVR System for AST (optional)

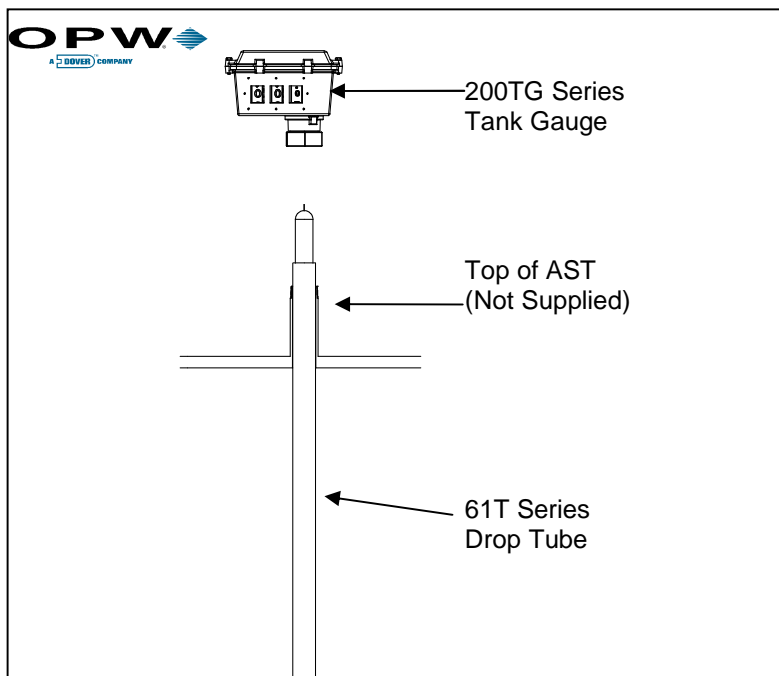


Figure 2H
Typical Tank Alarm Configuration of OPW Phase I EVR System for AST (optional)

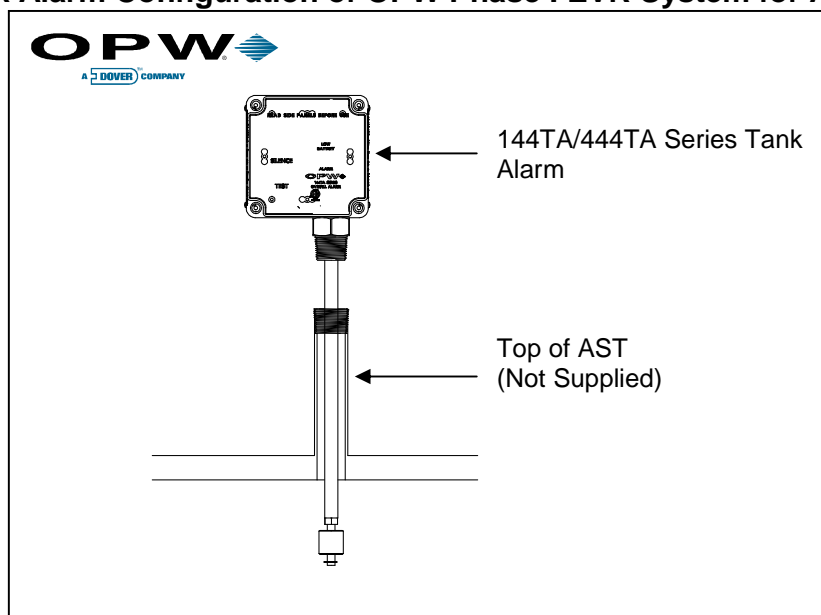


Figure 2l
Typical Tank Gauge and Alarm Combination Configuration of OPW Phase I EVR
System for AST (optional)

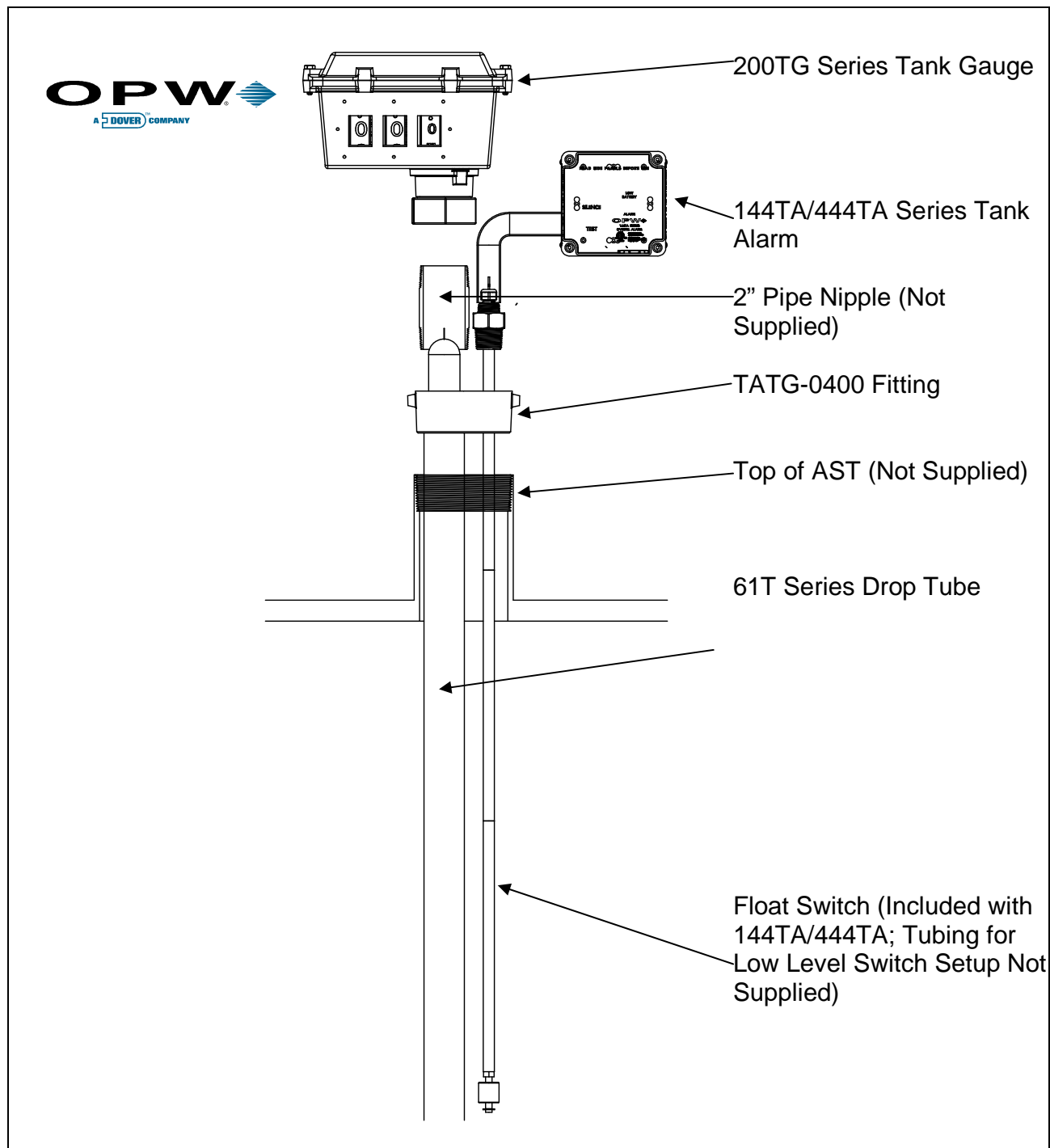


Figure 2J
Typical Dedicated Gauging Port with Drop Tube of OPW Phase I EVR System for AST

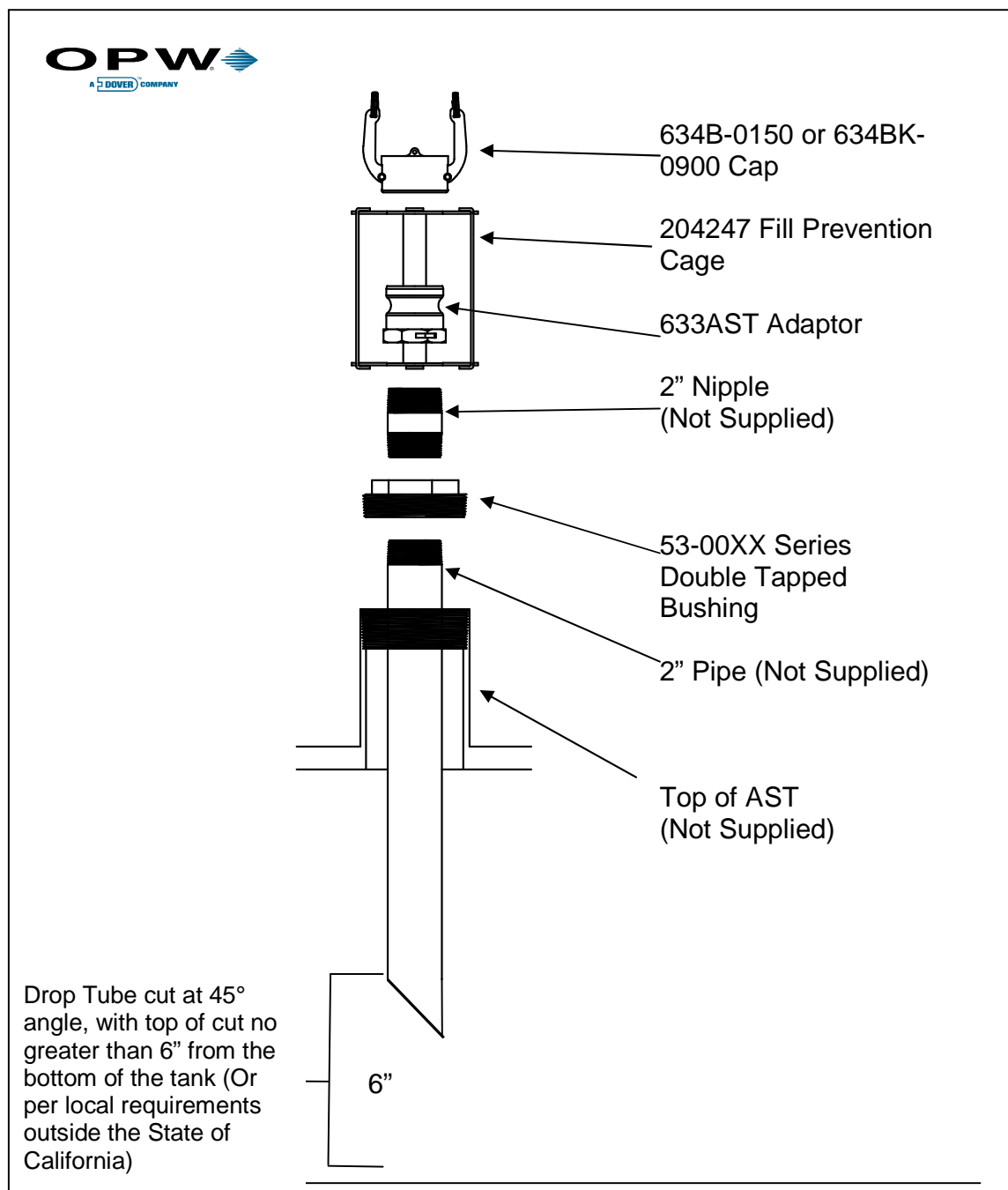
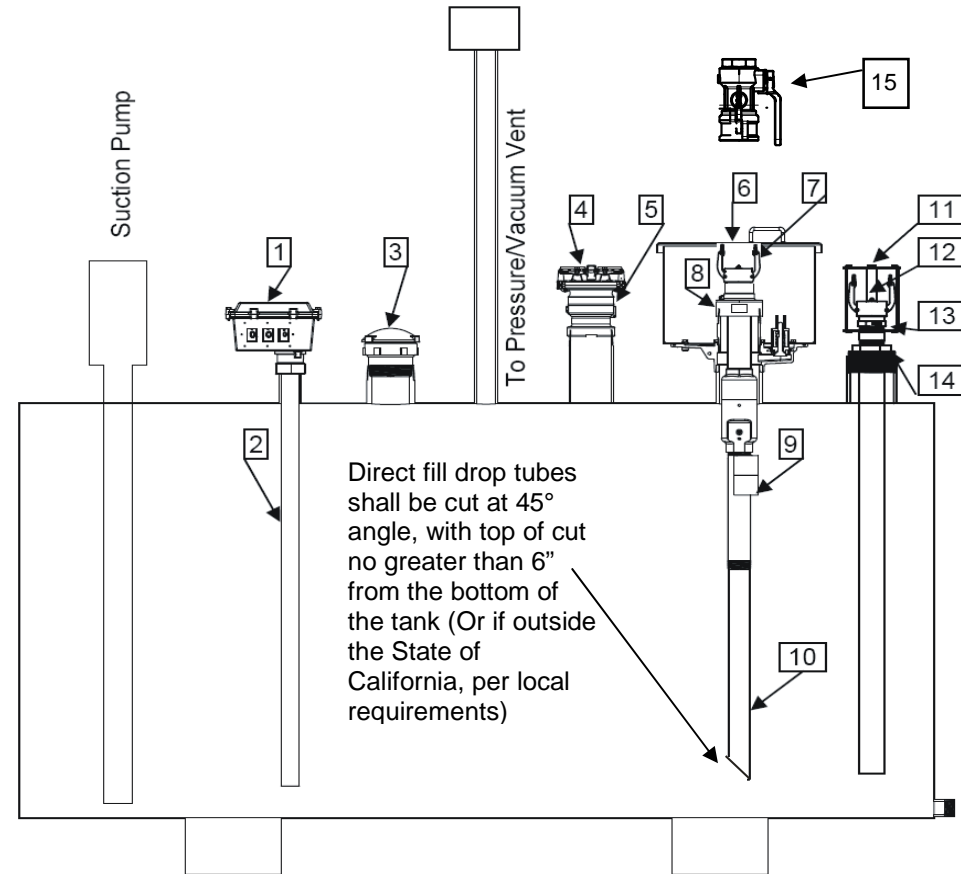
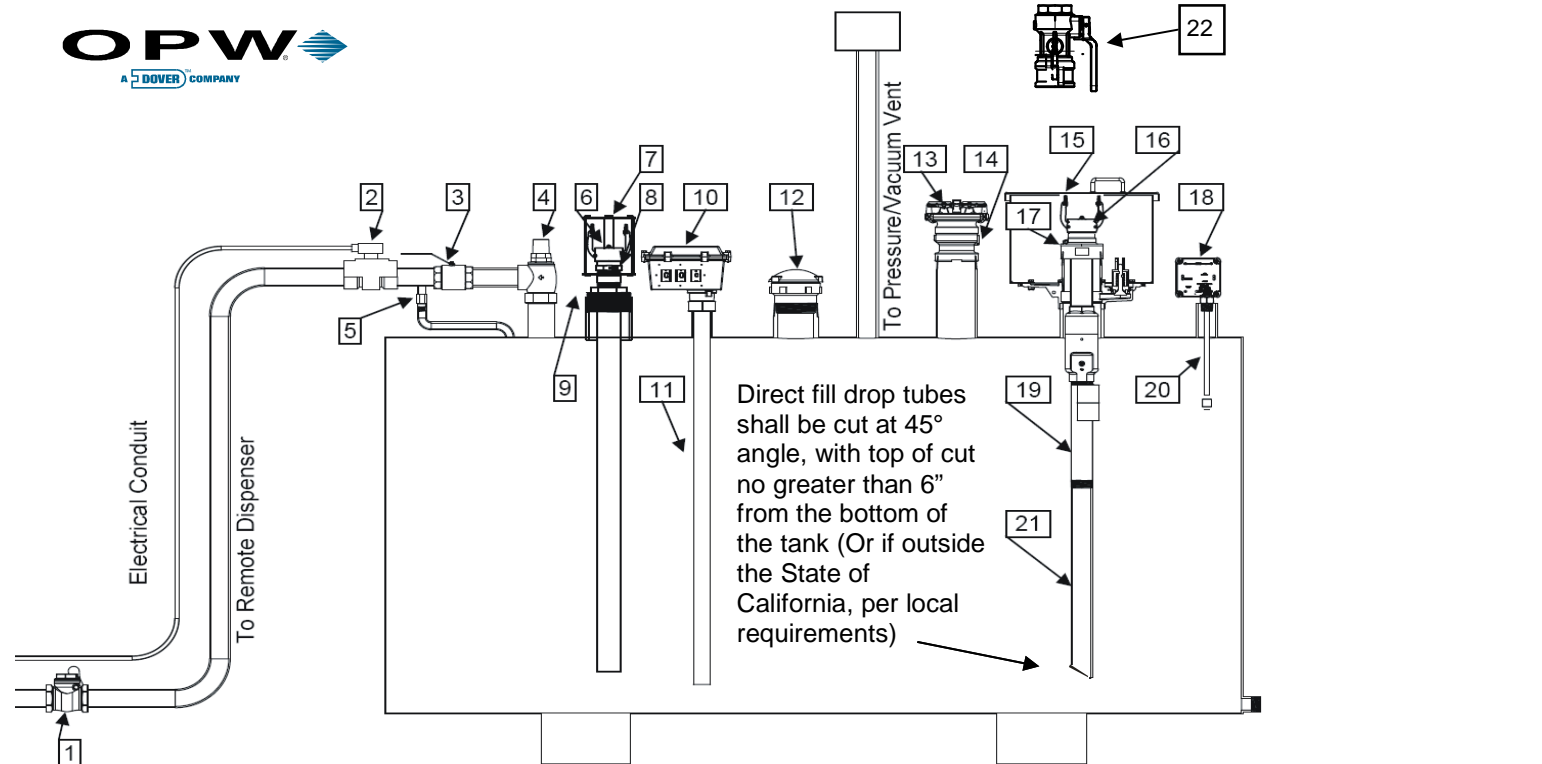


Figure 2K
Typical Configuration of OPW Phase I EVR System for AST with Direct Fill Spill Container



- | | | |
|--|---|--|
| 1. 200 TG Series Tank Gauge (optional) | 6. 331/332 Series Spill Container | 11. 204247 Fill Prevention Cage |
| 2. 61T Series Drop Tube | 7. 634B Series Dust Cap | 12. 634B-0150 or 634BK-0090 Cap |
| 3. 301 Series Emergency Vent | 8. 1611AN/1612AN Series Kamvalok Adaptor | 13. 633AST-2190 Adaptor |
| 4. 1711T or 1711LPC Series Vapor Recovery Cap | 9. 61fSTOP-XXXXT Series Overfill Prevention Valve | 14. 53-00XX Series Double Tapped Bushing |
| 5. 1611AV or 61VSA Series Vapor Recovery Adaptor | 10. 61FT Series Drop Tube | 15. 1711D-YYYY Kamvalok Coupler |

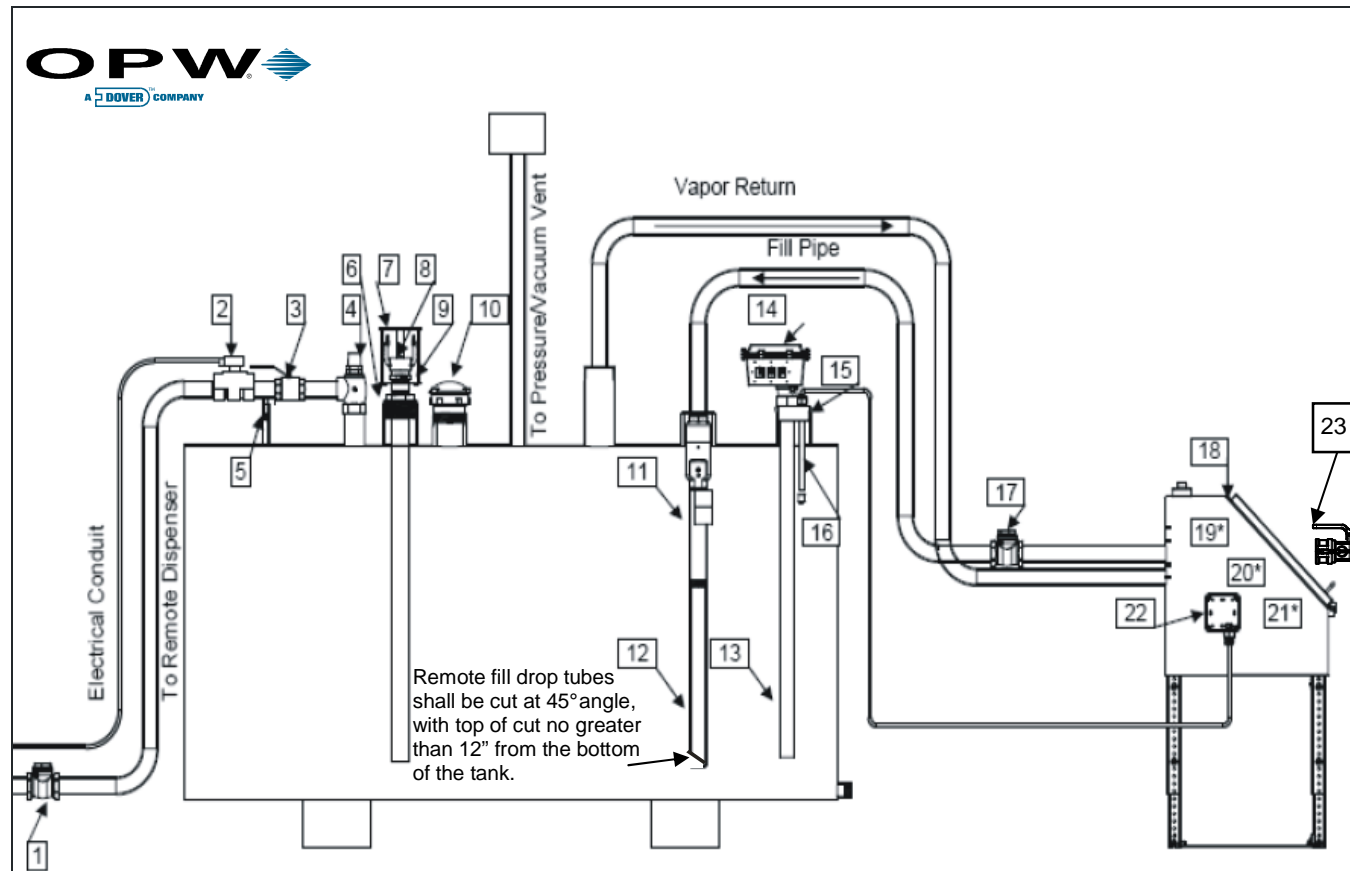
-16-

Figure 2L**Typical Configuration of OPW Phase I EVR System for AST's with Direct Fill Spill Container and Remote Dispensing**

- | | | |
|---|---|---|
| 1. 78S Series Emergency Valve (optional) | 10. 200TG Series Tank Gauge | 19. 61fSTOP-XXXXT Series Overfill Prevention Valve |
| 2. 821 Series Solenoid Valve (optional) | 11. 61T Series Drop Tube | 20. 44TA-LLFS Series Liquid Level Float Switch (optional) |
| 3. 21BV Series Ball Valve (optional) | 12. 301 Series Emergency Vent | 21. 61FT Series Drop Tube |
| 4. 199ASV Series Anti-Siphon Valve (optional) | 13. 1711T or 1711LPC Series Vapor Recovery Cap | 22. 1711D-YYYY Kamvalok Coupler |
| 5. 82RV Series Thermal Pressure Relief Valve (optional) | 14. 1611AV or 61VSA Series Vapor Recovery Adaptor | |
| 6. 634B-0150 or 634BK-0090 Cap | 15. 331/332 Series Spill Container | |
| 7. 204247 Fill Prevention Cage | 16. 634B Series Dust Cap | |
| 8. 633AST-0XXX Adaptor | 17. 1611AN/1612AN Series Kamvalok Adaptor | |
| 9. 53-00XX Series Double Tapped Bushing | 18. 144TA/444TA Series Tank Alarm (optional) | |

OPW Phase I EVR System for Aboveground Storage Tanks – VR-401-B

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Figure 2M**Typical Configuration of OPW Phase I EVR System for AST with Remote Fill and Remote Dispenser**

- | | | |
|--|---|---|
| 1. 178S Series Emergency Valve (optional) | 10. 301 Series Emergency Vent | 18. 6211R Series Remote Spill Container |
| 2. 821 Series Solenoid Valve (optional) | 11. 61fSTOP-XXXXT Series Overfill Prevention Valve | 19. 1611AN/1612AN Series Kamvalok Adaptor * |
| 3. 21BV Series Ball Valve (optional) | 12. 61FT Series Drop Tube | 20. 1611AV or 61VSA Series Vapor Recovery Adaptor * |
| 4. 199ASV Series Anti-Siphon Valve (optional) | 13. 61T Series Drop Tube | 21. 1711T or 1711LPC Series Vapor Recovery Cap * |
| 5. 82RV Series Pressure Relief Valve (optional) | 14. 200TG Series Tank Gauge (optional) | 22. 144TA/444TA Series Tank Alarm (optional) |
| 6. 53-00XX Series Double Tapped Bushing (optional) | 15. TGTA-0400 4" Gauge/Alarm Combo Fitting (optional) | 23. 1711D-YYYY Kamvalok Coupler |
| 7. 204247 Fill Prevention Cage | 16. 44TA-LLFS Liquid Level Float Switch (optional) | |
| 8. 634B-0150 or 634BK-0090 Cap | 17. 175 Series Swing Check Valve (optional) | |
| 9. 633AST-0XXX Adaptor | | |

*Inside Spill Container

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Figure 2N
Example of a GDF Maintenance Record

Date of Maintenance/ Test/Inspection/Failure	Repair Date To Correct Test Failure	Maintenance/Test/Inspection Performed and Outcome	Affiliation	Name and Certified Technician Identification Number of Individual Conducting Maintenance or Test	Telephone Number

Exhibit 3

Manufacturing Performance Standards and Specifications

The OPW Phase I EVR System for aboveground storage tanks (AST) and all components shall be manufactured in compliance with the applicable Phase I performance standards and specifications in CP-206, as well as the requirements specified in this Executive Order. All components shall be manufactured as certified; no change to the equipment, parts, design, materials or manufacturing process shall be made unless approved in writing by the Executive Officer. Unless specified in Exhibit 2 or in the ***ARB Approved Installation, Operation and Maintenance Manual for the OPW Phase I Enhanced Vapor Recovery System for Aboveground Storage Tanks***, the requirements of this section apply to the manufacturing process and are not appropriate for determining the compliance status of a gasoline dispensing facility (GDF).

Pressure/Vacuum Vent Valves

Factory testing, shipping and labeling of pressure/vacuum vent (PV) valves are described in Air Resources Board's Executive Orders (EO) VR-301-A and VR-302-A for Standing Loss Control of AST.

Vapor Recovery and Non-rotatable Product (Kamvalok) Adaptors

1. The vapor recovery and non-rotatable product adaptors shall not leak.
2. The vapor recovery adaptor cam and groove shall be manufactured in accordance with the cam and groove specifications shown in Figure 4B of CP-206.
3. Each OPW vapor recovery adaptor and Kamvalok non-rotatable product adapter shall be tested at the factory, and shall meet the applicable performance specifications listed in Table 3-1 and shall have affixed to it a card or label listing these specifications and a statement that the adaptor complied with such specifications when tested in the factory.

Spill Container and Drain Valves

Each spill container drain valve shall be tested at the factory. The spill container drain valve is configured to drain liquid directly into the ullage space. The drain valve is not certified with an allowable leak rate and shall not leak.

Drop Tube Overfill Prevention Device

Each Drop Tube Overfill Prevention Device shall be tested at the factory. The overfill device is installed below the OPW product adaptor (see figures 2A and 2E, Exhibit 2) which has a built in poppet (Kamvalok) to prevent spillage of product after delivery and vapors from escaping.

Emergency Vents

Each emergency vent shall be tested at the factory. Emergency vents are not certified with an allowable leak rate and shall not leak.

Tank Gauge Components

Tank gauge components shall be tested at the factory. Tank gauge components are not certified with an allowable leak rate and shall not leak

Kamvalok Product Coupler

Each Kamvalok product coupler shall be tested at the factory. Kamvalok product couplers shall fit the matching non-rotatable Kamvalok product adapters.

**Table 3-1
Manufacturing Component Standards and Specifications**

Component	Test Method	Standard or Specification
Phase I Adaptors	Exhibit 4	No Leaks
Phase I Vapor Adaptors *	Micrometer	Cam and Groove Standard (CP-206)
Phase I Rotatable Adaptors	TP-201.1B	Minimum, 360-degree rotation Maximum, 108 pound-inch average static torque
Spill Container Drain Valve	Exhibit 4	No Leaks
Overfill Prevention Device	Exhibit 4	No Leaks
Emergency Vents	Exhibit 4	No Leaks

* Product adaptor does not meet cam and groove standard. This was deemed acceptable because the propriety Kamvalok coupler shall be used for product delivery.

Exhibit 4
Determination of Static Pressure Performance of
Vapor Recovery Systems at Gasoline Dispensing Facilities with
Aboveground Storage Tanks

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the ARB Executive Officer or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

The purpose of this test procedure is used to quantify the vapor tightness of an aboveground storage tank (AST) installed at a gasoline dispensing facility (GDF).

This test procedure is used to determine the static pressure performance standard of a vapor recovery system during the certification process and subsequently to determine compliance with that performance standard for any installation of such a system.

The applicability of this test procedure for static pressure performance is for installations of systems with AST certified by:

CP-206 Certification Procedure for Vapor Recovery Systems at
Gasoline Dispensing Facilities Using Aboveground
Storage Tanks

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

The entire vapor recovery system is pressurized with nitrogen to two (2.0) inches water column. The system pressure is then allowed to decay for five (5) minutes. The acceptability of the final pressure is based upon the vapor system ullage.

3. BIASES AND INTERFERENCES

- 3.1 For tanks equipped with vapor recovery processor systems, the processor must be isolated or the processor outlet is capped. Leakage at the processor will indicate a system component leak.
- 3.2 Leaks in the test equipment will bias the results toward noncompliance. Prior to conducting the test, this bias is eliminated by conducting a leak check of the equipment.

- 3.3 There shall be no Phase I bulk product deliveries into the storage tank(s) within three (3) hours prior to this test. There shall be no product dispensing within thirty (30) minutes prior to this test. There shall be no Air to Liquid or Volume to Liquid Volumetric Ratio Test (TP-201.5 or equivalent) conducted within the twenty-four (24) hour period immediately prior to this test.
- 3.4 Product levels less than four (4) inches above the highest opening at the bottom of the submerged drop tube may bias the test toward noncompliance.
- 3.5 For systems which utilize a destructive processor, power to the collection unit and the processor shall be turned off during testing.
- 3.6 For vacuum-assist systems with positive displacement vacuum pumps, which locate the vacuum producing device in-line between the Phase II vapor riser and the storage tank, the following requirements shall apply:
 - 3.6.1 A valve shall be installed at the vacuum producing device. When closed, this valve shall isolate the vapor passage downstream of the vacuum producing device.
 - 3.6.2 The upstream vapor passage (nozzle to vacuum producing device) shall also be tested. Methodology for this test shall be submitted to the Executive Officer for approval prior to submission of test results or shall be conducted in accordance with the procedures set forth in the applicable ARB Executive Order.

4. EQUIPMENT SPECIFICATIONS

- 4.1 Traffic Cones. If needed for safety, use traffic cones to encircle the area while the test is being conducted.
- 4.2 Care must be exercised to prevent exposure of testing personnel to benzene, a carcinogen. Use of appropriate safety gear such as gloves and respirator is suggested.
- 4.3 Use commercial grade nitrogen in a high pressure cylinder, equipped with a two-stage pressure regulator and one pressure per square inch gauge (psig) pressure relief valve. The minimum and maximum nitrogen feed rates into the system shall be 1.0 and 5.0 cfm (cubic feet per minute) respectively.
- 4.4 The System Leak Test Assembly is shown in Figure 1. Use a modified vapor cap compatible with the Phase I vapor adaptor. The vapor cap shall be equipped with a nitrogen inlet port.

- 4.5 Use a Dwyer flowmeter, Model RMC-104, or equivalent, to determine the required pressure setting of the delivery pressure gauge on the nitrogen supply pressure regulator. This pressure shall be set such that the nitrogen flowrate is between 1.0 and 5.0 cfm.
- 4.6 Electronic pressure measuring devices or digital pressure indicators shall be used. The maximum full-scale range of the device shall be 10 inches water column. The minimum accuracy shall be 1.5 percent of full scale and the pressure measuring device shall be readable to the nearest 0.01 inches water column. A copy of the most current calibration of shall be kept with the equipment. Instrument shall be calibrated every six months.
- 4.7 Stopwatch. Use a stopwatch accurate to within 0.10 seconds to time the one-minute pressure stabilization period, and the five-minute decay test period.
- 4.8 Leak Detection Solution or a Combustible Gas Indicator. Any liquid solution designed to detect vapor leaks may be used to verify the pressure integrity of system components during this test; or a combustible gas detector that complies with the requirements of U.S. EPA Method 21, "Determination of Volatile Organic Compounds Leaks", 40 CFR Ch. 1, Part 60, App. A-7 (36 FR 24877, December 23, 1971) and section 5 of this test procedure. Personnel shall assume that the combustible gas detector will be operated in an explosive atmosphere and comply with all pertinent regulations.

5. CALIBRATION PROCEDURE

- 5.1 The electronic pressure measuring device or digital pressure indicator shall be calibrated using a National Institute of Standards and Technology (NIST) traceable standard or reference standard traceable to NIST within 180 days prior to conducting the testing and the calibration. In addition, calibration shall be conducted after any repairs or alterations to the pressure measuring or indicating device. Calibrations shall be conducted per manufacturer's instructions, ensuring it complies with the minimum accuracy requirement of 1.5 percent of full scale. A copy of the most current calibration shall be kept with the equipment.
- 5.2 The flowmeter shall be calibrated every 180 days using a NIST traceable standard or a reference standard traceable to NIST as specified by the manufacturer's instructions.
- 5.3 Calibrate the combustible gas detector per the manufacturer's recommendation. Calibration gas shall be certified traceable to NIST-SRM.
 - 5.3.1 The calibration gases must be certified according to one of the following options:

5.3.1.1 The EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (EPA-600/R-97/121 September 1997), or

5.3.1.2 To an analytical accuracy of ± 2 percent, traceable to a reference material approved by the National Institute of Standards and Technology (NIST) and recertified annually.

5.3.2 Documentation. Information on calibration gas cylinders shall be entered into a log identifying each cylinder by serial number. Sufficient information shall be maintained to allow a determination of the certification status of each calibration gas and shall include: (1) the data put in service, (2) assay result, (3) the dates the assay was performed, (4) the organization and specific personnel who performed the assay, and (5) the date taken out of service.

6. PRE-TEST PROCEDURES

- 6.1 Place the traffic cones around the perimeter of the testing area, allowing sufficient space to safely conduct the test.
- 6.2 Electronic manometers shall have a warm-up period of at least 15 minutes followed by a five-minute drift check. If the drift exceeds 0.01 inches water column, the instrument should not be used.
- 6.3 Record system information on Form 1.
- 6.4 The minimum ullage during the test shall be 25 percent of the tank capacity and the maximum ullage during the test shall be 75 percent of the tank capacity. For manifolded tanks, the minimum ullage during the test shall be 25 percent of the aggregate tank capacity and the maximum ullage during the test shall be 75 percent of the aggregate tank capacity.
- 6.5 Determine the allowable system leak rate using Equation 8-1 in section 8.
- 6.6 Ensure the nozzle(s) are properly hung in the dispenser boot and all dispenser cabinet covers are in place. No dispensing shall be allowed during the test.
- 6.7 If a steel-braided nitrogen supply line is not used, a ground strap should be employed during the introduction of nitrogen into the system.
- 6.8 This test shall be conducted with the dust caps removed from both the product and the vapor coupler(s).

- 6.9 If the Phase I containment box is equipped with a drain valve, this test shall be conducted with the drain valve installed.
- 6.10 Conduct visual inspection of vapor recovery components to ensure no cracks, tears, or other anomalies are present that may cause a failure of the leak test.
- 6.11 Install system leak test assembly. An example is shown in Figure 1. Additional examples can be found in TP-201.3 (Figures 1-3).

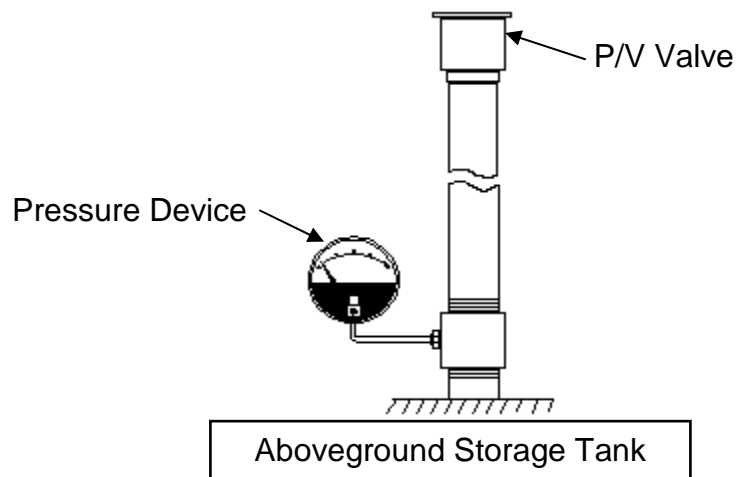
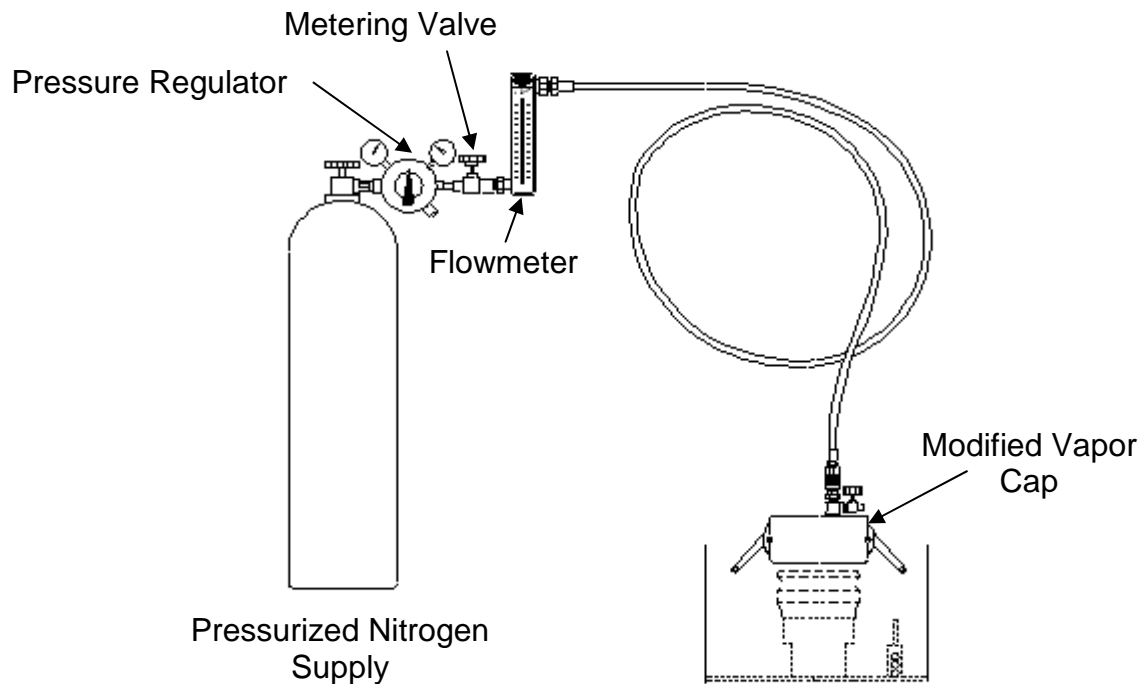
7. TEST PROCEDURE

- 7.1 Observe the initial storage tank pressure. If the initial pressure is greater than one-half (0.50) inch H₂O gauge, proceed to Section 7.1.1. If the initial pressure is less than zero (0.00) inch H₂O gauge, proceed to Section 7.1.2. In the case where the storage tank pressure is between 0.00 and 0.50 inches H₂O, proceed to section 7.2.
 - 7.1.1 If the initial storage tank pressure is greater than one-half (0.50) inch H₂O gauge, carefully bleed off the excess pressure in accordance with all applicable safety procedures for a maximum of 30 seconds. Do not allow the tanks to remain open to atmosphere for more than 30 seconds or the ingestion of fresh air and additional vapor growth may result. Start the stopwatch and measure the storage tank pressure for three (3) minutes. If the 3-minute pressure exceeds 0.50 inches H₂O or continues to change at a rate exceeding ± 0.02 inches H₂O in 3 minutes, repeat this Section. Several attempts may be required.
 - 7.1.2 If the initial storage tank pressure is less than zero (0.00) inches H₂O gauge, slowly introduce nitrogen so that the storage tank pressure is between zero (0.00) and one-half (0.50) inches H₂O gauge. Start the stopwatch and measure the storage tank pressure for three (3) minutes. If the 3-minute pressure is not between 0.00 and 0.50 inches H₂O or continues to change at a rate exceeding ± 0.02 inches H₂O in 3 minutes, repeat this Section.
- 7.2 Open the nitrogen gas supply valve, regulate the delivery pressure to at least 10 psig, and pressurize the vapor system (or subsystem for individual vapor return line systems) to or slightly above 2 inches water column. The minimum and maximum nitrogen feed rates in to the system shall be 1.0 and 5.0 cfm respectively. It is critical to maintain the flow until both flow and pressure stabilize, indicating temperature and pressure stabilization in the tanks. Close the nitrogen supply valve.
- 7.3 Check the system leak test assembly using leak detection solution to verify that the test equipment is leak tight. Quickly remove the vapor cap assembly.
- 7.4 Re-open the nitrogen supply valve, and reset the tank pressure to reestablish a pressure slightly greater than 2 inches water column. Close the nitrogen supply

valve and start the stopwatch when the pressure reaches an initial pressure of 2.0 inches of water column.

- 7.5 At one-minute intervals during the test, record the system pressure on Form 1. After five minutes, record the final system pressure on Form 1. Carefully remove the system leak test assembly.
- 7.6 Use Equation 8-1 in section 8 or Table 1 to determine the compliance status of the facility by comparing the final five-minute pressure with the minimum allowable pressure.

Figure 1
Typical System Leak Test Assembly



8. CALCULATING RESULTS

Minimum Allowable Pressure

The minimum allowable pressure after five (5) minutes, with an initial pressure of 2.0 inches water column, shall be calculated as shown below, or obtained from Table 1:

Equation 8-1

$$P_f = 2e^{(-223.9/V)}$$

where:

P_f	=	Minimum pressure after 5 minutes, inches water column
V	=	Ullage of the system, gallons
e	=	Constant equal to 2.71828
2	=	Initial starting pressure, inches water column
-223.9	=	Decay constant for a 5 minute test

9. REPORTING RESULTS

Report the results as indicated on Form 1. District may require the use of alternate forms provided they include the same minimum parameters identified in Form 1.

10. ALTERNATIVE TEST PROCEDURES

This procedure shall be conducted as specified. Modifications to this test procedure shall not be used to determine compliance unless prior written approval has been obtained from the ARB Executive Officer, pursuant to Section 15 of Certification Procedure CP-206.

Form 1
Summary of Source Test Data

Static Pressure Performance Test				
<p>GDF Name and Address:</p> <p>GDF Representative and Title:</p> <p>GDF Phone #:</p> <p>GDF # _____</p> <p>Manifolded? Y or N</p>	<p align="center">PHASE II SYSTEM TYPE (Check One)</p> <p>Balance _____</p> <p>VacAssist _____</p> <p>Other _____</p> <p>Manufacturer: _____</p> <p>Permit Conditions:</p>			
<p align="right">TANK # :</p> <p>1. Product Grade</p> <p>2. Actual Tank Capacity, gallons</p> <p>3. Gasoline Volume</p> <p>4. Ullage, gallons (ullage = capacity-volume)</p> <p>5. Initial Pressure (inches water column)</p> <p>6. Pressure After 1 Minute</p> <p>7. Pressure After 2 Minutes</p> <p>8. Pressure After 3 Minutes</p> <p>9. Pressure After 4 Minutes</p> <p>10. Final Pressure After 5 Minutes</p> <p>11. Allowable Final Pressure</p>	1	2	3	4
<p>Test Conducted by:</p> <p>Date of Test:</p>	<p>Test Company:</p> <p>Test Contractor Certification Number:</p> <p>Expiration Date:</p>			

TABLE 1
Leak Rate Criteria

ULLAGE (GALLONS)	MINIMUM PRESSURE AFTER 5 MINUTES, (INCHES OF WATER COLUMN)
100	0.21
150	0.45
200	0.65
250	0.82
300	0.95
350	1.05
400	1.14
450	1.22
500	1.28
550	1.33
600	1.38
650	1.42
700	1.45
750	1.48
800	1.51
850	1.54
900	1.56
950	1.58
1,000	1.60
1,200	1.66
1,400	1.70
1,600	1.74
1,800	1.77
2,000	1.79
2,200	1.81
2,400	1.82
2,600	1.83
2,800	1.85
3,000	1.86
3,500	1.88
4,000	1.89
4,500	1.90
5,000	1.91
6,000	1.93
7,000	1.94
8,000	1.94
9,000	1.95
10,000	1.96
15,000	1.97
20,000	1.98